

Ethanol

- Ewan Moffat,
Environmental Health
Specialist II, Site
Assessment and
Mitigation.

Summary of Talk

- State mandate.
- Basic overview of ethanol.
- Current uses.
- Sampling methods.
- Why sample?
- Case study.

Change to Ethanol

- **Executive Order D-5-99 to change over December 2002.**
- **76 stations changed over December 2000.**
- **Ethanol not 'fungible'.**

| Property | Benzene | MtBE | Ethanol |
|--|----------------|---------------|-----------------|
| % used in reformulated gasoline | <1 | 11-15% | 5-10% |
| Solubility (mg/l) | 1,780 | 43,000 | Miscible |
| Henry's Constant | 0.22 | 0.02 | 0.000252 |
| MCL (ug/l) | 1 | 13 | N/A |
| Vapor Pressure (mmHg) | 95 | 245 | 49-56 |
| Reid Vapor Pressure* (38° C) [mmHg] | 103 | 403 | 931 |

***Reid Vapor Pressure is a measure of the pressure of a vapor above a sample of gasoline in a standard bomb at 100°F (38°C).**

Cancer Risks

- MtBE is a **suspected** human carcinogen.
- Ethanol is a **confirmed** human carcinogen.

Current Uses of Ethanol

- Gasohol - Midwest
- Pure ethanol (95+%) - Brazil

PREÇO MÁXIMO POR LITRO:

| | | |
|-----|-------|--------------------|
| R\$ | 1,881 | GASOLINA |
| R\$ | 1,908 | GASOLINA ADITIVADA |
| R\$ | | GASOLINA PREMIUM |
| R\$ | 1,336 | ÁLCOOL |
| R\$ | | ÁLCOOL ADITIVADO |
| R\$ | 0,927 | DIESEL |
| R\$ | 0,954 | DIESEL ADITIVADO |
| R\$ | | QUEROSENE |

VIGÊNCIA: 06/07/01

SOCIAL: AUTO POSTO









Sampling Techniques

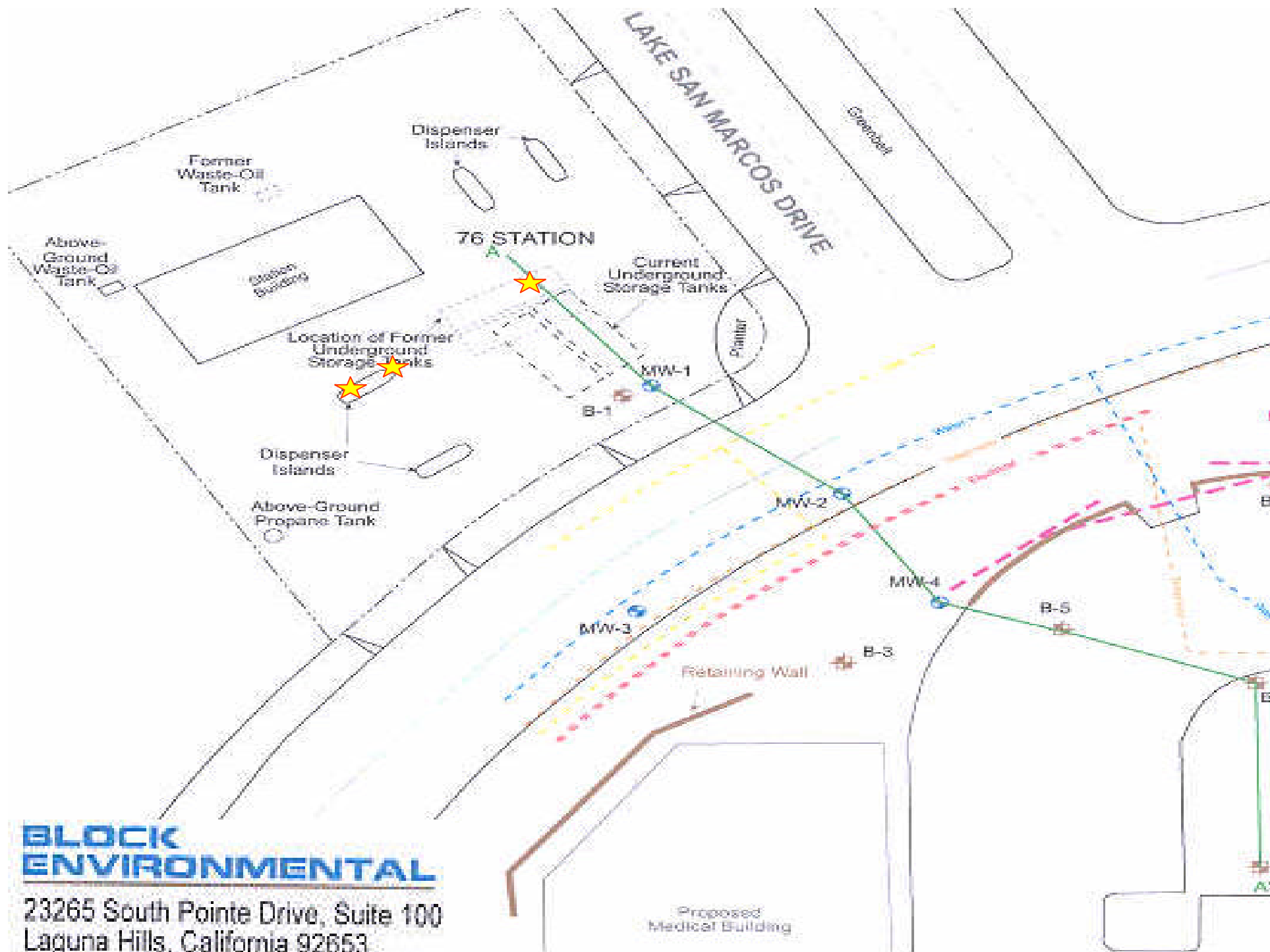
- EPA 8015B.
- EPA 8260B.
- 40 ml vials.
- Request 'Ethanol' on COC.

Why SAM Would Like to See Sampling

- Tracer study.
- Preferential Biodegradation / Increased benzene plumes.
- Cosolvency of BTEX.
- Future MCLs possible.

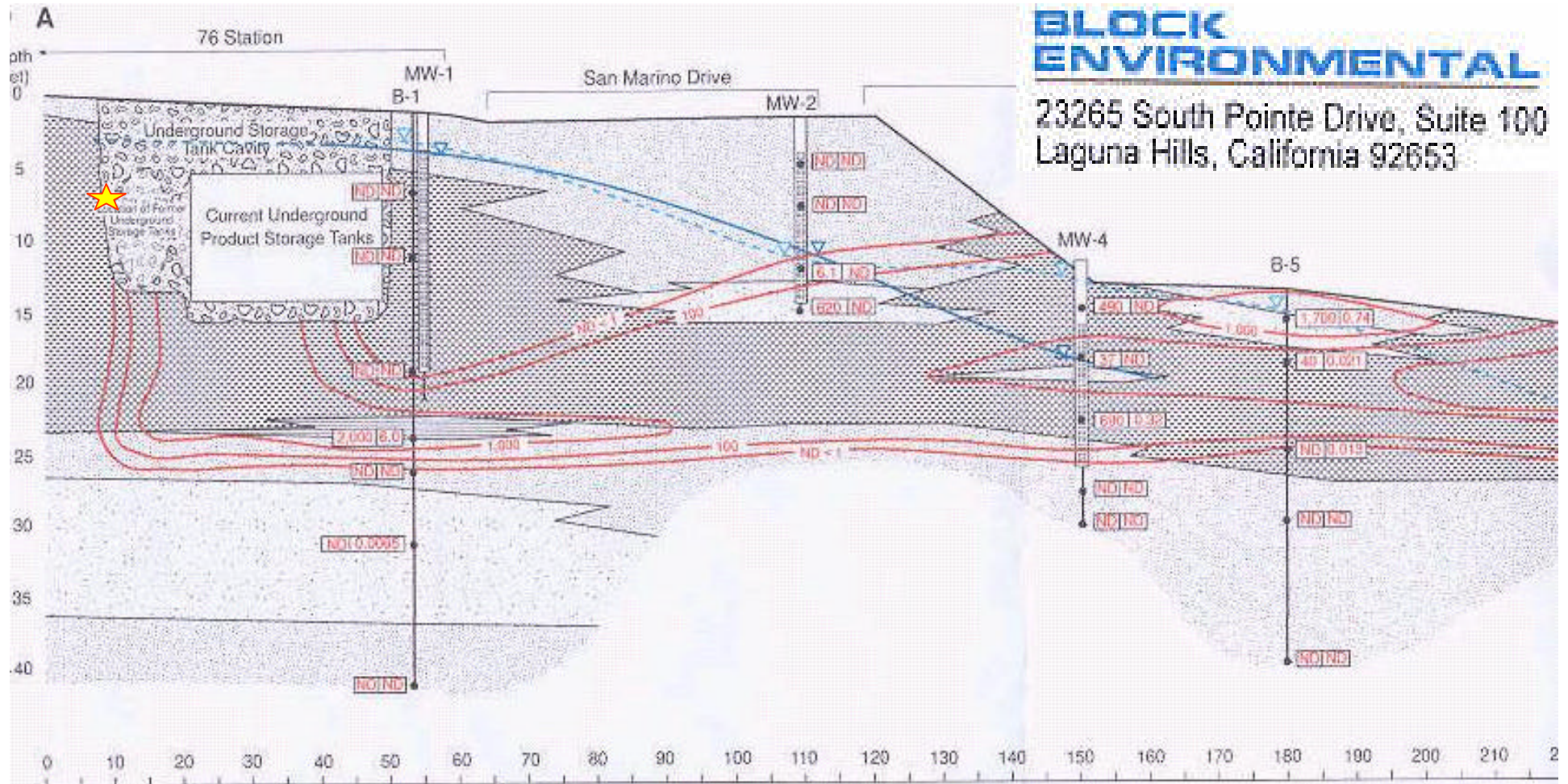
Current Sampling Results

- Groundwater monitoring.
- Tank removal soil data.



BLOCK ENVIRONMENTAL

23265 South Pointe Drive, Suite 100
Laguna Hills, California 92653



LEGEND

- Tank Cavity Backfill
- Clean Sands
- Silty, Fine Sands
- Silt
- Clay

TPH_g Benzene

Soil Sample Location Showing Hydrocarbon Concentrations in parts per million

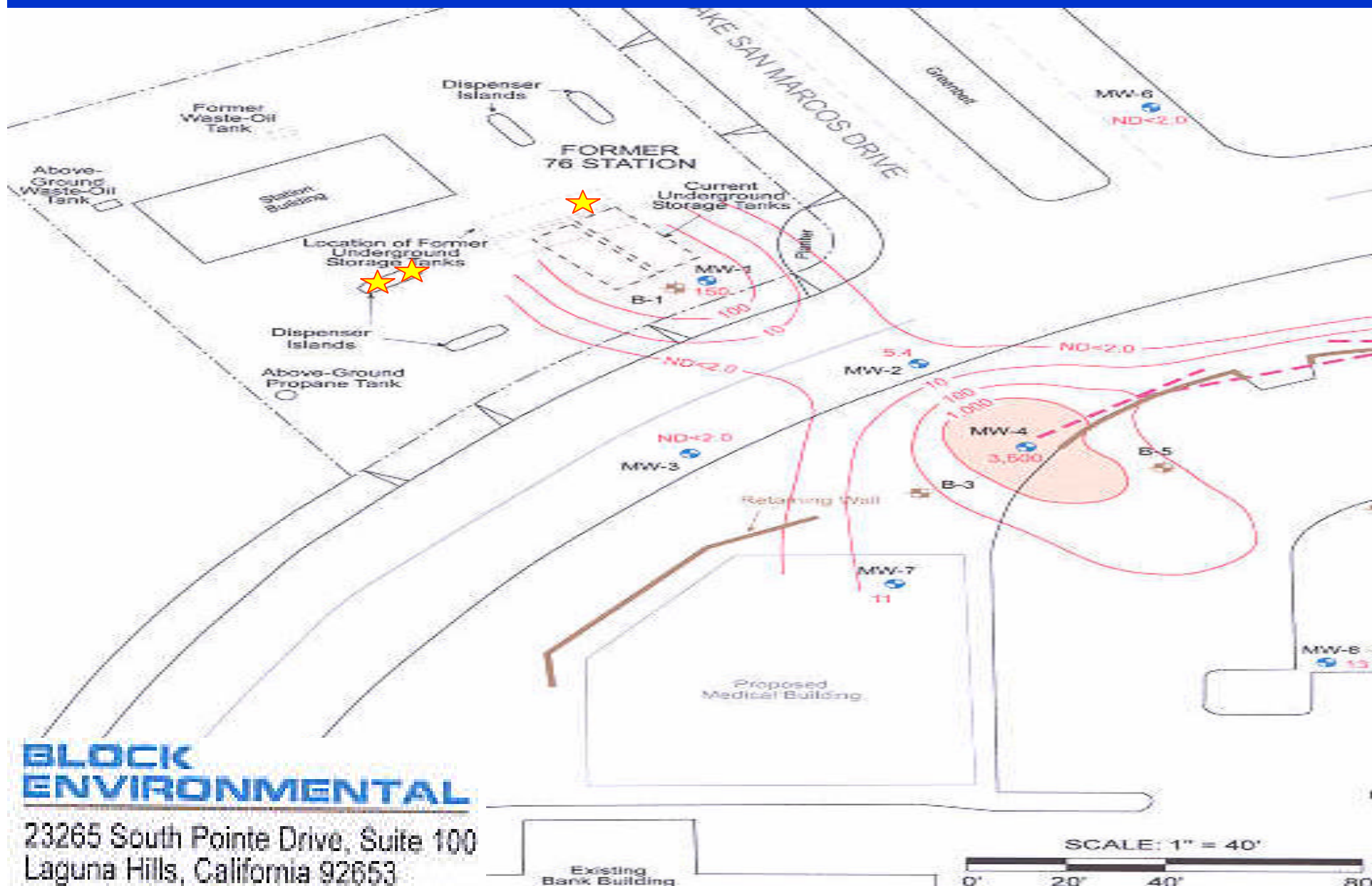
TPH Isoconcentration Contour Line (Contour Interval As Shown)

Groundwater Elevation Observed During Drilling

Groundwater Elevation In Monitoring Wells Following Development






Notes: TPH_g = total petroleum/g
ND = not detected




Groundwater Benzene Plume










| SAMPLE | D1-3  | D-2-3.5  | T2N-6.5  | | MW-1  | MW-1  |
|---------|---|---|--|--|---|---|
| DEPTH | 3' | 3.5' | 6.5' | | 3.36' | 7.51' |
| DATE | 10/19/01 | 10/19/01 | 10/19/01 | | 9/12/01 | 12/11/01 |
| UNITS | mg/kg | mg/kg | mg/kg | | ug/l | ug/l |
| Benzene | <0.01 | 0.22 | <0.005 | | 41 | 35 |
| MtBE | 1.5 | 0.39 | 0.540 | | 3900 | 1200 |
| TBA | 1.3 | <0.250 | <0.250 | | 4600 | 4400 |
| EtOH | 0.29 | 19 | 15 | | <100 | <100 |

D1-3 
 D2-3.5 
 T2N-6.5 

 MW-1

Conclusions and Recommendations

- Establish baseline.
- Sample six months before change.
- Consider changes in benzene plume size.

emoffaeh@co.san-diego.ca.us